

Fabrication Principles for Provisional Restorations in Aesthetic Treatment

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Provisional restorations have a clear influence on the outcome of aesthetic dental treatment. At this stage, the clinician is able to evaluate a patient's phonetic and aesthetic expectations as well as the fit and integration of the intended restorations. Clinicians thus need to have an understanding of how to simply and predictably perform the involved steps. This presentation demonstrates direct and indirect methods of creating aesthetic provisional restorations.

Fabricating provisional restorations can be one of the more challenging aspects of aesthetic treatment. This article examines both direct and indirect provisionalization techniques. The direct technique is used primarily for anterior partial-coverage restorations (eg, porcelain veneers); the indirect technique is used for full-coverage restorations or larger-span cases.

CASE PRESENTATIONS

Case 1: Direct Technique

According to the direct technique, a clear flowable composite (Point 4, Kerr/Sybron, Orange, CA) and a bisacryl material (Temphase, Kerr/Sybron, Orange, CA) are combined to create an aesthetic provisional restoration that will attempt to mimic the appearance and contours of the definitive restoration. A patient with a "peg" lateral incisor presented for placement of porcelain laminate veneers (Figure 1). A diagnostic waxup was created and duplicated, and a vacuum-formed template was fashioned for the fabrication of the provisional restoration.

Once the preparations were completed, the template was tried in to ensure that adequate tooth reduction had been accomplished. The flowable composite was then placed in a thin layer along the incisal edge of the template (Figure 2). Care was taken not to make this layer too large in an incisogingival dimension. Since this layer was planned as a solid, clear material from the labial

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FIGURE 1. CASE 1. Preoperative view of a patient with a peg lateral incisor who will have porcelain laminate veneers placed for aesthetic enhancement.

to the lingual aspects, it appeared quite translucent. If this layer were too thick, the provisional restoration would appear to have an unnaturally large translucent incisal edge (Figure 3). The correct thickness of material should be about half of this dimension in an incisogingival dimension. Once this layer was placed, it was light cured through the template to prevent it from running while the next layer was built up.

The clear material was then placed in vertical lines to approximate the developmental lobes of the tooth (Figure 4). These lines were positioned thicker in a labiolingual direction, since the bisacryl material would be placed behind them. After placement of this layer, the material was cured from both sides of the template (Figure 5). The template was then filled with the appropriate shade of bisacryl material (Figure 6).

The filled template was subsequently seated onto the prepared teeth and allowed to set for 60 seconds (Figure 7). Removal of the provisionals was recommended at this point to allow the clinician to develop the contour and embrasures with thin diamond discs. If the provisional restorations had been locked on at this point, such finishing would have been accomplished intraorally. It was the author's preference, however, to perform the finishing procedures extraorally and then to cement the restorations with an aesthetic provisional cement (eg, Temp-Bond, Kerr/Sybron, Orange, CA) (Figure 8). The definitive ceramic restorations were then bonded into place (Figure 9).



FIGURE 2. Clear-shaded flowable composite is placed in a thin layer along the incisal edge of the template. The clinician must be careful not to make this layer too large incisogingivally.



FIGURE 3. Since this layer is of solid, clear material, it will appear translucent. If this layer is made too thick, the provisional will appear to have an unnaturally large translucent incisal edge.



FIGURE 4. Clear material is then placed in vertical lines to approximate the developmental lobes of the tooth. These lines can be thicker in a labiolingual direction, since they will have bisacryl placed behind them.



FIGURE 5. After placement of this layer, the material is cured from both sides of the template.



FIGURE 8. It is preferable to perform finishing extraorally and then to cement the restorations with an aesthetic provisional cement.



FIGURE 6. The template is then filled with the appropriate shade of bisacryl material. For this patient, shade A2 was used.



FIGURE 7. The filled template is being seated onto the prepared teeth and held in place for 60 seconds while the material reaches its set stage. If possible, the provisional restorations should be removed and contoured.

Case 2: Indirect Technique

This patient presented for placement of a natural maxillary anterior fixed partial denture (FPD). A laboratory-fabricated provisional restoration was used to create an ovate pontic receptor site, which directly supported the author's goal of delivering a natural-looking anterior FPD. The ovate pontic receptor site was established through the use of an ErCr:YSGG hard and soft tissue laser (Waterlase, Biolase, San Clemente, CA). According to the author's experience, this has been the easiest, most atraumatic way to create pontic receptor sites.

Since the tooth had been missing for some time, it became necessary for the clinician to create the same type of socket that existed in the extraction scenario (Figures 10 and 11). As part of the planning process, an occlusal photograph was taken over the proposed surgical site to determine whether or not sufficient faciolingual bone thickness existed to perform the procedure (Figure 12).

After the teeth were prepared and the existing FPD was removed, the laboratory-fabricated provisional restoration (BioTemps, Glidewell Laboratories, Newport Beach, CA) was used to guide pontic site development (Figures 13 and 14). The tissue side of the pontic was marked with a color transfer applicator, and the provisional was seated (Figure 15). Using the soft tissue setting, the laser was used to develop the pontic site by removing the tissue where ink was present (Figure 16). The provisional was then resealed and tissue





FIGURE 9. Immediate postoperative view of the definitive porcelain laminate veneers luted in place.



FIGURE 10. CASE 2. Preoperative view of preexisting FPD. The patient is dissatisfied with the bulbous nature of the ridge lap pontic and requests an aesthetic replacement.



FIGURE 11. When the existing FPD is removed, it is apparent that the extraction site was not treated as an ovate pontic receptor site. The ridge has completely healed over and there are no interdental papilla adjacent to the edentulous space.



FIGURE 12. Viewed occlusally, it is evident that there is insufficient faciolingual ridge width for the clinician to proceed with an ovate pontic receptor site.

sculpting continued wherever ink remained (Figure 17). Utilizing the laser at the hard tissue setting, 1 mm of bone was then conservatively removed (Figure 18). When sufficient gingiva was present between the bone and the pontic, impressions were taken, and the FPD was provisionally cemented (Figures 19 through 22). After necessary adjustments, the provisional bridge was recemented, and the patient was reevaluated 3 weeks later to ensure that the tissue was completely healed prior to cementation of the definitive all-ceramic FPD (Figures 23 and 24).

DISCUSSION

The ovate pontic receptor site is a depression or socket created in the soft tissue that enables the cervical aspect of the pontic emerging from it to appear to surface from the alveolar ridge. In addition, since the pontic occupies the site of the original tooth, the emergence profile of the pontic appears natural, especially when compared to a modified ridge lap pontic. Modified ridge lap pontics also have the disadvantage of appearing too long when compared to adjacent or contralateral teeth. The external edges of the soft tissue depression are approximately 3 mm higher than the floor of the depression, and on the mesial and distal sides, these represent the new interproximal papilla. The desired shape of the depression has been described as resembling the larger, rounded end of an egg. Biologic width principles apply to the pontic receptor site as well, and the clinician must ensure that 2 mm of gingival tissue will be present between the base

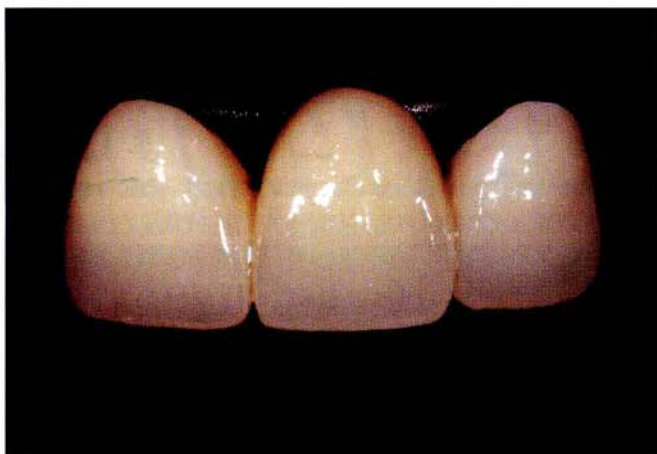


FIGURE 13. The provisional FPD (BioTemps, Glidewell Laboratories, Newport Beach, CA) has been designed to support the ovate pontic receptor site that will be surgically created.

of the depression and the alveolar bone. If necessary, laser can be used to remove some alveolar bone and, if necessary after soft tissue shaping, to reestablish the biologic width. There are two scenarios that can occur prior to creating an ovate pontic receptor site: the patient with the tooth that still needs to be extracted, and the patient with already established edentulous space.

In the event that the tooth must be extracted, treatment is relatively straightforward and predictable, and is typically an aesthetic success. The primary advantage in this situation is the presence of the interdental papilla prior to extraction that will allow the clinician to achieve superior aesthetics. The use of a laboratory-fabricated provisional restoration is the most predictable method to treat this type of case. Using the model, the laboratory technician is able to visualize the tooth targeted for removal, and then tooth sockets are prepared to mimic the extraction site. It is preferable to have the tissue side of the pontic longer rather than shorter since there is no chance of biologic width violation in this case. The laboratory should attempt to have 3 mm of pontic extend into the extraction site apical to the free gingival margin. The key is to preserve the papilla during the extraction procedure and to fill the extraction site with the provisional pontic as soon as possible. The time-honored practice of having the patient bite down on a 2×2 gauze to arrest bleeding is contraindicated in this procedure. Following tooth extraction, the interdental papillae have no support until the cementation of the provisional, and by biting on



FIGURE 14. The technician prepares the model for the provisionals to match the intraoral surgical site. The pontic of the provisional FPD will be a template for the surgical site.



FIGURE 15. The tissue side of the BioTemps pontic is marked with a color transfer applicator that has been dipped in a small drop of water on a wax-backed paper pad.



FIGURE 16. When the bridge is tried in, the ink leaves a mark on the ridge where the tissue needs to be removed by the laser. Note the atraumatic removal of tissue in the area that has marked.



FIGURE 17. Upon try-in of the FPD, additional tissue that must be removed from the mesial and facial aspects of the pontic can be observed.

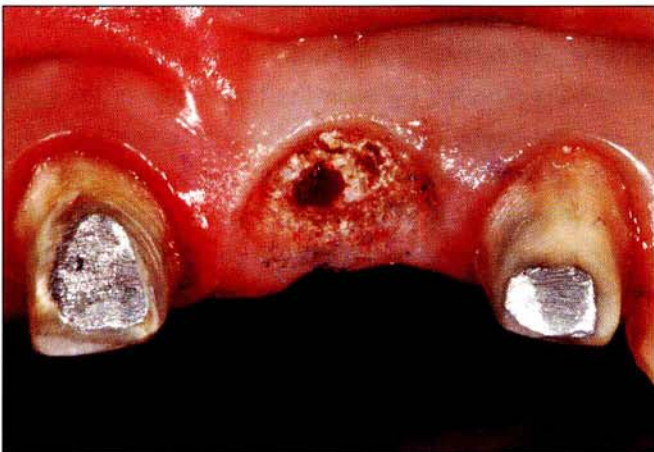


FIGURE 18. The laser is used at hard tissue setting for bone removal. Note that 2 mm of space must exist for the junctional epithelium.

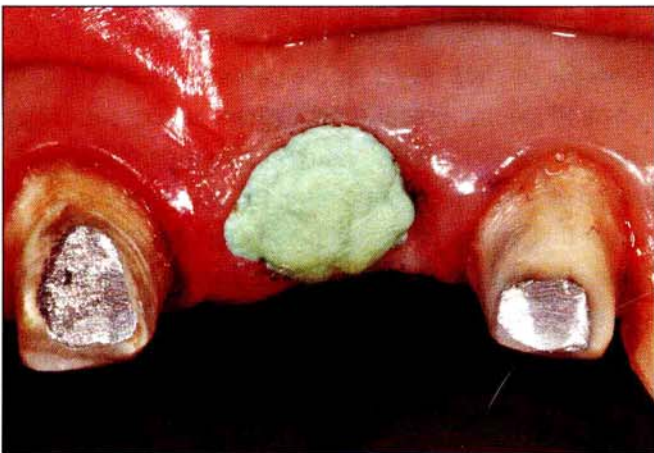


FIGURE 19. Gingival retraction paste (ExpaSyl, Kerr/Sybron, Orange, CA) is placed in the pontic site and the first retraction cords (size 00) are placed, the preparations are finished, and then the second cord (size 2) is placed.



FIGURE 20. The ExpaSyl is rinsed from the pontic site and the top cord is removed. Medium body syringe material is extruded into the site and around the preparations.

the gauze, the patient will most likely collapse the papillae, causing the clinician to lose the benefit of their presence. In order to preserve maximum facial and interproximal bone, it behooves the clinician to strive for an atraumatic extraction, with the use of more conservative instruments such as periostomes.

In long-standing extractions, the loss of facial bone in the edentulous area may have resulted in a lack of bone and soft tissue in the ovate pontic receptor site. In a case like this, the clinician may be forced to utilize a modified ridge lap pontic, or perhaps refer the patient to a periodontist for possible ridge augmentation. While the interdental papillae have been irreversibly lost in such situations, the second case presented herein discussed the simulation of interdental papillae through soft tissue sculpting and provisional contouring.

While the mesiodistal width of the pontic space may appear excessive as it is being developed, this tissue is necessary to form natural-looking simulated interdental papillae. Although soft tissue sculpting is completed when approximately 3 mm of the tissue side of the pontic are apical to the free gingival margin, and the FPD seats without blanching the socket site, biologic width remains a concern. A periodontal probe should be inserted into the deepest part of the pontic site and pushed into the tissue until it contacts bone. If there is 2 mm or more tissue remaining on the crestal bone, the provisional FPD can be cemented. If there is less than 2 mm of tissue remaining, it is necessary to remove



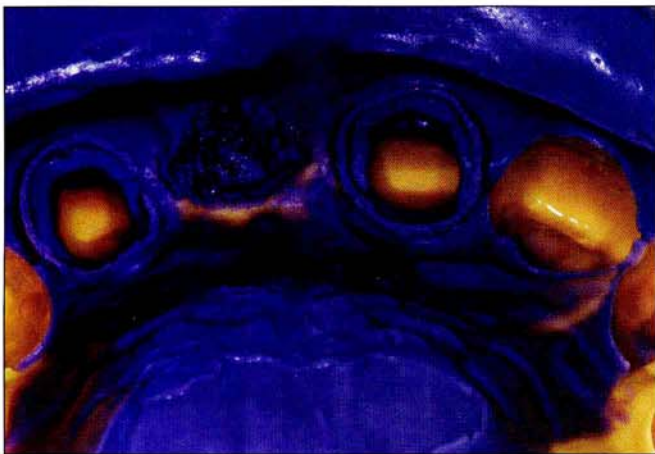


FIGURE 21. The master impression (Capture, Glidewell Direct, Newport Beach, CA) must capture the details of the preparations (including 1 mm of subgingival tooth structure) to ensure the laboratory can properly fabricate the restoration.



FIGURE 22. Facial view of the provisional FPD (BioTemps, Glidewell Laboratories, Newport Beach, CA) immediately after surgery and provisional cementation.

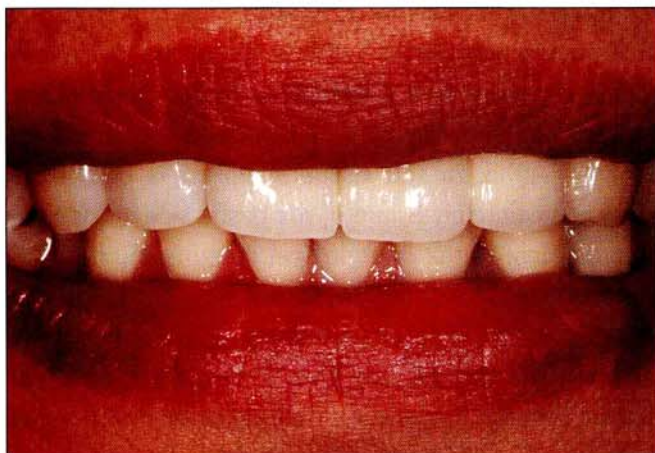


FIGURE 23. Postoperative view of the cemented FPD (WolCeram, Glidewell Laboratories, Newport Beach, CA). The patient is pleased with the aesthetic appearance of the restoration.



FIGURE 24. Postoperative view of the all-ceramic FPD. The ovate pontic receptor site represents the best opportunity to recreate a tooth emerging from gingival tissues.

enough crestal bone to allow for the 2 mm of gingiva between the bone and the pontic. A minimum of 2 mm of space is required between the tissue side of the pontic and the crestal bone to allow the soft tissue to fill this space. Impressions can be taken and acrylic material from the tissue side of the pontic can be removed if the pontic site appears excessively deeper than 3 mm. It is initially preferable to have the laboratory make the pontic slightly too long rather than slightly too short, as it is usually impossible to add acrylic to the tissue side of the pontic at this point.

CONCLUSION

The use of a clear template for accurate provisionalization and definitive restoration using direct composites provides the clinician with a clear blueprint for the necessary parameters based on the patient's existing condition and tooth preparation. When using indirectly fabricated provisional restorations for tissue development, particularly within a pontic receptor site, it is critical to ensure that proper biological parameters are maintained. Clinicians can successfully restore compromised dentition using both direct and indirect modalities, provided the necessary clinical condition is developed and maintained throughout treatment. Incorporating the aforementioned techniques for aesthetic provisionalization will provide progressive practitioners with the tools needed to ensure repeatable success when delivering any type of single- or multiunit restoration.